

In The Drawings

The attached sheet of drawings includes changes to Figs. 4A and 4B. In this sheet, Fig. 4A replaces original Fig.4, and new Fig. 4B is added.

Fig. 4B is a new drawing for illustrating "the size of the microlenses disposed in the center region is reduced by 5-50 % compared with the size of the microlenses disposed in the edge region" as recited in amended claim 5.

REMARKS

The Examiner is thanked for the thorough examination of the present application. The Office Action, however, tentatively rejected all claims 1-27. Applicant has relabeled FIG. 4 as FIG. 4A, and has added new FIG. 4B, to more clearly illustrate a novel and non-obvious feature of original claim 5. Support for this limitation can be found on page 8 lines 2-17 of the specification and in Fig. 4. Therefore no new matter has been added to the application by the addition of this drawing sheet.

In the specification, the paragraphs added after paragraph on page 8, line 17 clearly describe the added Fig. 4B. Support for this description can be found on page 8 lines 2-17 of the specification, in original Fig. 4, and in original claims 4-10 of the application. Accordingly, this amendment adds no new matter to the application.

Original claims 1-27 remain in the application.

Rejections Under 35 U.S.C. 102(b)

Claims 1-3, 7-9, 11-14, 18-22, 24-26 stand rejected under 35 U.S.C 102(b) as allegedly anticipated by Endo et al. (US 6,255,640). Applicant respectfully traverses the rejections for at least the reasons discussed below.

Among other distinguishing features, independent claims 1 and 24 each recite "the size of each microlens being a function of the distance between the microlens to a chip center". This unique feature is to balance the brightness on different regions of a chip. (See specification, page 7, lines 8-17). The Office Action alleged that this feature was taught by Endo (citing "fig. 1, column 2, lines 42-65, fig. 11. Column 7, lines 1-15). Applicant respectfully disagrees.

In contrast, Endo et al. teaches that the curvature of the microlens is a function of a distance from the microlens to the sensing area. Specifically, Endo et al. teach the curvature of

the microlenses 117, 27 is chosen to have a desired value depending on a distance from the light receiving sensor units 102, 12 to the microlenses 117, 27. See col. 2, lines 21-30 and col. 6, 27-35. Fig. 11 of Endo et al. shows the relation between the F value of a camera lens and the relative sensitivity in the solid-state image sensing device.

Significantly, Endo et al. do not teach or suggest “the size of each microlens being a function of the distance between the microlens to a chip center”, as specifically recited in independent claims 1 and 24.

The Office Action acknowledged that the term “curvature” means a measure or amount of curving, specifically, the rate of change of the angle through which the tangent to a curve turns in moving along the curve and which for a circle is equal to the reciprocal of the radius. Further, Applicant notes that the “curvature” is not “size” of the microlens. See Merriam-Webster Online (<http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=curvature&x=9&y=11>). Further, the application discloses “the incident light transmitted into the microlenses and reaching the sensing areas of an image sensor.....” in page 7, lines 3-4, and thus, the light receiving sensor units 102, 12 of Endo et al. are equivalents with the sensing areas of the claimed embodiments.

Consequently, Endo et al. appear to teach that the curvature of the microlens is a function of a distance from the microlens to the sensing area, but do not teach or suggest “the size of each microlens being a function of the distance between the microlens to a chip center,” as specifically claimed.

Endo et al. implies that the camera lens is NOT a microlens. Endo et al. disclose a slant incident light with respect to the microlens 27 increases as if the diaphragm of image sensing lens of camera is opened as shown in Fig. 10 in Col 6, lines 49-51. In a camera, the camera lens is embedded in the camera housing and the diaphragm thereof controls light transmitting to the

microlenses of the image sensor in the camera, which is well known by those skilled in the art. Further, the size of the camera lens is constant. The F value is defined as a ratio of image distance of the camera lens and the diaphragm opening.

Consequently, Endo et al. teach the relation between the F value of a camera lens and the relative sensitivity in the solid-state image sensing device, but do not teach or suggest “the size of each microlens being a function of the distance between the microlens to a chip center” of the invention.

For at least the foregoing reasons, independent claims 1 and 24 are allowable over the cited references. Insofar as claims 2-10 and 25-27 depend from claims 1 and 24, it is Applicant’s belief that these claims are also allowable.

As described, Endo et al. do not teach or suggest the limitations claimed in claims 2-3, 7-9, 11, 25-26.

Independent claims 12 and 20 recite “the distance between a center of the microlens and a center of the corresponding sensing area being a function of the distance between the corresponding sensing area to a chip center”. This unique feature is to improve non-uniformly effective incident light. See page 8, lines 19-30.

As described above, Endo et al. teach the curvature of the microlens is a function of a distance from the microlens to the sensing area, but do not teach or suggest “the distance between a center of the microlens and a center of the corresponding sensing area being a function of the distance between the corresponding sensing area to a chip center” of the invention. Therefore, claims 12 and 20 are allowable over the cited references. Insofar as claims 13-18, 21-23 depend from claims 12 and 20, these claims are also allowable.

Further, Applicant submits that Endo et al. do not teach or suggest the limitations claimed in claims 13-14, 18-19, 21-22.

As a separate and independent basis for the patentability of claims 4-6, 10, 15, 16, 23, and 27, Applicant respectfully submits that the Office Action has failed to cite a proper motivation or suggestion for combining the cited references. For example, in combining Endo and Yamamoto to reject claim 6, the Office Action stated only that the combination would have been obvious "to be half the size of the microlenses located on the outer regions to improved the focused light while increasing the light sensitivity..." Similarly, in combining Endo and Matom to reject claim 10, the Office Action stated only that the combination would have been obvious "to improve pixel quality and to avoid or minimize crosstalk in adjacent regions." These and other alleged motivations are clearly improper in view of well-established Federal Circuit precedent.

It is well-settled law that in order to properly support an obviousness rejection under 35 U.S.C. § 103, there must have been some teaching in the prior art to suggest to one skilled in the art that the claimed invention would have been obvious. W. L. Gore & Associates, Inc. v. Garlock Thomas, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983). More significantly,

"The consistent criteria for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ... Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure... In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill in the art is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention."

(Emphasis added.) In re Dow Chemical Company, 837 F.2d 469, 473 (Fed. Cir. 1988).

In this regard, Applicant notes that there must not only be a suggestion to combine the

functional or operational aspects of the combined references, but that the Federal Circuit also requires the prior art to suggest both the combination of elements and the structure resulting from the combination. Stiftung v. Renishaw PLC, 945 Fed.2d 1173 (Fed. Cir. 1991). Therefore, in order to sustain an obviousness rejection based upon a combination of any two or more prior art references, the prior art must properly suggest the desirability of combining the particular elements to derive an image sensor, as claimed by the Applicant.

When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references. Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the "absence of such a suggestion to combine is dispositive in an obviousness determination").

Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, inter alia, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. See In re Dembicza, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Although a reference need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be "clear and particular." Dembicza, 175 F.3d at 999, 50 USPQ2d at 1617.

If there was no motivation or suggestion to combine selective teachings from multiple prior art references, one of ordinary skill in the art would not have viewed the present invention as obvious. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); Gambro Lundia AB, 110 F.3d at 1579, 42 USPQ2d at 1383 ("The absence of such a suggestion to combine is dispositive in an obviousness determination.").

Significantly, where there is no apparent disadvantage present in a particular prior art reference, then generally there can be no motivation to combine the teaching of another reference with the particular prior art reference. Winner Int'l Royalty Corp. v. Wang, No 98-1553 (Fed. Cir. January 27, 2000).

Merely identifying some benefit (from hindsight) that results from a combination is not sufficient to justify the combination, and the motivation or suggestion must come from the prior art itself, and the Office Action has failed to identify such proper motivations. For at least the additional reasons that the Office Action failed to identify proper motivations or suggestions for combining the various references to properly support the rejections under 35 U.S.C. § 103, those rejections should be withdrawn.

No fee is believed to be due in connection with this amendment and response. If, however, any fee is deemed to be payable, you are hereby authorized to charge any such fee to Deposit Account No. 20-0778.

Respectfully submitted,



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Annotated Drawing Sheet

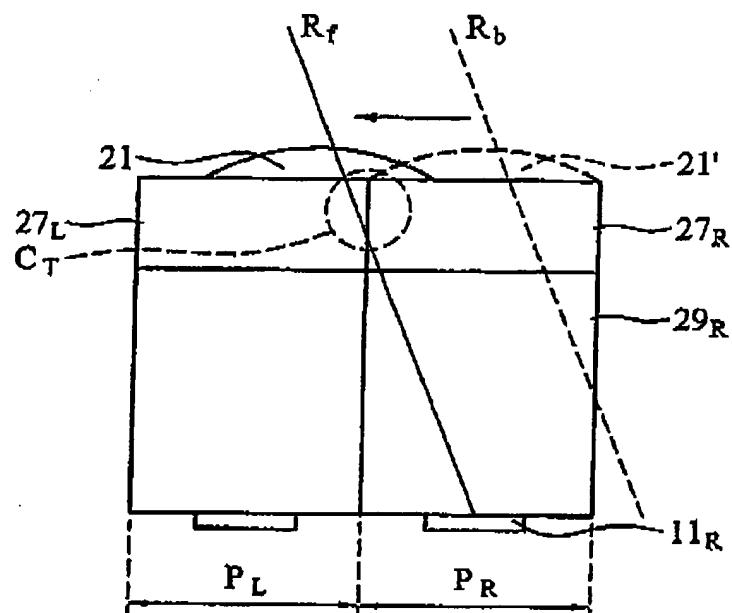


FIG. 3 (PRIOR ART)

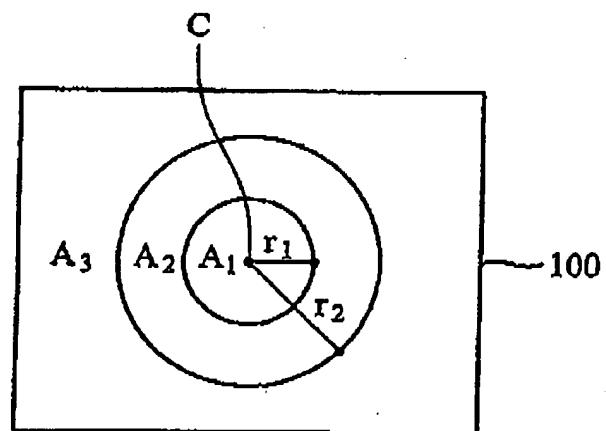


FIG. 4A